

WHAT IS CLAIMED IS:

1. A process for making a film, comprising:
 providing a birefringent dielectric multilayer film that reflects at least 50% of light in
 a band at least 100 nm wide in a wavelength region of interest; and
 heat setting the film to render the film capable of shrinking to conform without
 substantial wrinkling to a substrate having a compound curvature.
2. The process of claim 1, wherein the wavelength region of interest is from
 about 700 nm to about 2000 nm.
3. The process of claim 1, wherein the film is comprised of alternating layers of
 a first polymer and a second polymer.
4. The process of claim 3, wherein the first polymer is selected from the group
 consisting of PEN and coPEN, and the second polymer is selected from the group consisting
 of PMMA and co-PMMA.
5. The process of claim 3, wherein the first polymer is coPET and the second
 polymer is selected from the group consisting of PET and co-PMMA.
6. The process of claim 4, wherein the heat set temperature is about 390 °F to
 about 400 °F for about 10 seconds.
7. The process of claim 5, wherein the heat set temperature is about 440 °F to
 about 470 °F for about 10 seconds.
8. The process of claim 1, when the film is stretched in a tenter with a toe in
 selected to control film shrinkage.
9. The process of claim 8, wherein the tenter has a toe in of about 0 inches to
 about 2 inches, for a maximum tenter width of about 70 inches.
10. A process for making a film, comprising:
 providing a birefringent dielectric multilayer film that reflects at least 50% of light in
 a band at least 100 nm wide in a wavelength region of interest; and

4 heat setting the film at a temperature sufficient to enable the film to shrink at least
5 about 0.4% in both in-plane directions upon heating.

1 11. The process of claim 10, wherein the temperature is sufficient to enable the
2 film to shrink at least about 0.7% in at least one in-plane direction upon heating.

1 12. The process of claim 10, wherein the temperature is sufficient to enable the
2 film to shrink at least about 1.0 % in at least one in-plane direction upon heating.

1 13. The process of claim 10, wherein the wavelength region of interest is from
2 about 700 nm to about 2000 nm

2 14. A birefringent dielectric multilayer film that reflects at least 50% of light in a
3 band at least 100 nm wide in a wavelength region of interest, wherein the film is heat set at a
4 temperature sufficient to render the film capable of shrinking to conform without substantial
wrinkling to a substrate having a compound curvature.

1 15. The film of claim 14, wherein the wavelength region of interest is from about
2 700 nm to about 2000 nm.

1 16. The film of claim 14, wherein the film is capable of being laminated between
2 two substrates without substantial wrinkling, wherein the substrates have a compound
3 curvature.

1 17. The film of claim 14, wherein the film is comprised of alternating layers of a
2 first polymer and a second polymer.

1 18. The film of claim 17, wherein the first polymer is selected from the group
2 consisting of PEN and coPEN, and the second polymer is selected from the group consisting
3 of PMMA and co-PMMA.

1 19. The film of claim 17, wherein the first polymer is coPET and the second
2 polymer is selected from the group consisting of PET and co-PMMA.

1 20. A birefringent dielectric multilayer film that reflects at least 50% of light in a
band at least 100 nm wide in a wavelength region of interest, wherein the film is heat set at a

temperature sufficient to enable the film to shrink at least about 0.4 % in both in-plane directions upon heating.

21. The film of claim 20, wherein the wavelength region of interest is from about 700 nm to about 2000 nm

22. The film of claim 20, wherein the film is heat set at a temperature sufficient to enable the film to shrink at least about 0.7% in at least one in-plane direction upon heating

23. The film of claim 20, wherein the film is heat set at a temperature sufficient to enable the film to shrink at least about 1.0 % in at least one in-plane direction upon heating.

24. The film of claim 20, wherein the film has a first shrinkage in a first in-plane direction and a second shrinkage in a second in-plane direction, and the first direction is normal to the second direction.

25. A process for making a laminate article, comprising:

(a) assembling a laminate comprising the following layers: a first non-planar layer of a glazing material, a first energy absorbing layer, a film layer, a second energy absorbing layer and a second non-planar layer of a glazing material, wherein the film layer comprises a birefringent dielectric multilayer film that reflects at least 50% of light in a band at least 100 nm wide in a wavelength region of interest;

(b) heating the laminate, removing residual air between the layers, and bonding the layers, wherein the energy absorbing layers and the film layer conform to the shape of the non-planar glass layers;

(c) further heating and applying pressure to the laminate to bond the layers together and form an optical structure;

(d) cooling the structure, wherein the structure exhibits substantially no wrinkling in the film layer.

26. The process of claim 25, wherein the wavelength region of interest is from about 700 nm to about 2000 nm.

1 27. The process of claim 25, wherein the laminate is bonded and de-aired in step
2 (b) by at least one of a nip roller, a vacuum ring and a vacuum bag.

1 28. The process of claim 25, wherein the laminate is heated in step (b) to below
2 the Tg of a dominant polymer in the film.

1 29. The process of claim 28, wherein the dominant polymer is coPEN, and the
2 laminate is heated to less than about 240 °F.

1 30. The process of claim 28, wherein the dominant polymer is PET, and the
2 laminate is heated to between about 180 and about 240 °F.

1 31. The process of claim 25, wherein the laminate is heated in step (c) to about
2 275 °F to about 295 °F at a maximum pressure of about 165 to about 200 psi.

1 32. The process of claim 25, wherein the cooling rate in step (d) is less than about
2 13 °F per minute in the vicinity of the Tg of a dominant polymer in the film.

1 33. The process of claim 25, wherein the second energy absorbing layer further
2 comprises a shadeband layer.

1 34. The process of claim 25, wherein the glazing layers have at least one
2 compound curve forming at least part of their surfaces.

1 35. The process of claim 34, wherein the film has a first shrinkage in a first
2 direction and a second shrinkage in a second direction normal to the first direction, and the
3 first shrinkage is different from the second shrinkage, and wherein the shrinkages in the first
4 and second directions are matched to the shape of the compound curve in the surface of the
5 glass layers.

1 36. The process of claim 34, wherein the compound curve has a first curvature in
2 a first direction and a second curvature in a second direction, and the first curvature is greater
3 than the second curvature, and wherein the shrinkage of the film is greatest in the direction of
4 the first curvature.

37. The process of claim 25, wherein the energy absorbing layer comprises PVB.

38. A process for nip roll laminating a glazing article, comprising:

(a) assembling a laminate comprising the following layers: a first non-planar layer of a glazing material, a first energy absorbing layer, a non-metallized film layer, a second energy absorbing layer and a second non-planar layer of a glazing material, wherein the film layer reflects at least 50% of light in a band at least 100 nm wide in a wavelength region from about 700 to about 2000 nm;

(b) heating the laminate, removing residual air between the layers, and bonding the layers with a nip roller, wherein the energy absorbing layers and the film layer conform to the shape of the non-planar glass layers without substantial cracking and or creasing

39. The process of claim 38, further comprising:

(a) heating and applying pressure to the laminate to bond the layers together and form an optical structure; and

(b) cooling the structure.

40. The process of claim 38, wherein the film layer comprises a birefringent, dielectric multilayer film.

41. A pre-laminate comprising a layer of an energy absorbing material and a layer of a film, wherein the film layer comprises a birefringent dielectric multilayer film that reflects at least 50% of light in a band at least 100 nm wide in a wavelength region of interest, wherein the film is heat set at a temperature sufficient to render the film capable of shrinking to conform without substantial wrinkling to a substrate having a compound curvature.

42. A pre-laminate comprising a layer of an energy absorbing material and a layer of a film, wherein the film layer comprises a birefringent dielectric multilayer film that reflects at least 50% of light in a band at least 100 nm wide in a wavelength region of interest, wherein the film is heat set at a temperature sufficient to render the film capable of shrinking by at least about 0.4% in both in-plane directions upon heating.

43. The pre-laminate of claim 41, wherein the wavelength region of interest is from about 700 nm to about 2000 nm.

44. The pre-laminate of claim 42, wherein the wavelength region of interest is from about 700 nm to about 2000 nm.

45. The pre-laminate of claim 41, further comprising a second layer of an energy absorbing material on a surface of the film opposite the first layer of energy absorbing material.

46. The pre-laminate of claim 45, wherein the second layer of energy absorbing material further comprises a shade band layer.

47. A laminate comprising the pre-laminate of claim 45 between two non-planar layers of a glazing material.

48. A laminate comprising the pre-laminate of claim 46 between two non-planar layers of a glazing material.

49. An optically clear laminate article comprising the following layers: a first non-planar layer of glass, a first layer of PVB, a film layer, a second layer of PVB and a second non-planar layer of glass, wherein the film layer comprises a birefringent dielectric multilayer film that reflects at least 50% of light in a band at least 100 nm wide positioned between wavelengths from about 700 nm to about 2000 nm, wherein the film is heat set at a temperature sufficient to render the film capable of shrinking to conform without substantial wrinkling to the non-planar glass layers.

50. The laminate article of claim 49, wherein the layers of glass have a compound curvature.

51. The laminate article of claim 49, wherein the article is a windshield for a vehicle.

52. A vehicle comprising an optically clear laminate article comprising the following layers: a first non-planar layer of glass, a first layer of PVB, a film layer, a second

3 layer of PVB and a second non-planar layer of glass, wherein the film layer comprises a
4 birefringent dielectric multilayer film that reflects at least 50% of light in a band at least 100
5 nm wide positioned between wavelengths from about 700 nm to about 2000 nm, wherein the
6 film is heat set at a temperature sufficient to render the film capable of shrinking to conform
7 without substantial wrinkling to the non-planar glass layers..

1 53. The vehicle of claim 52, wherein at least a portion of the first and second
2 layers of glass has a compound curvature.

1 54. The vehicle of claim 46, wherein the article further comprises a shade band
2 layer.

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